NOT FOR PUBLICATION

FOREST INSECT CONDITION REPORT

Intermountain and Northern Rocky Mountain States

(As of November 1, 1957)

SPECIAL ITEMS

Mountain Pine Beetle

Last year it was reported that mountain pine beetle was showing an increasing trend in Region 4. The surveys this year confirmed the observation. The greatest concentration of infested trees is within the Ashley and Wasatch National Forests. This is not new because the infestation in that area has been at a high level for some years. Other areas extending to the north and west have shown an increasing number of infestation centers. Thus, the areas around Jackson, Wyoming on the Teton National Forest, Grand Teton National Park, and some private land show increased activity. The Sawtooth National Forest in southern Idaho also shows an increase. It means that continued vigilance is required in the lodgepole stands and control in these centers of infestation should receive close attention.

Spider Mites

This year saw a new situation develop. Spider mite damage by Oligonychus ununguis (Jac.) appeared in Montana and southern Idaho in fir stands sprayed during 1956 to control budworm. A few lesser infestations have been noted outside spray areas but heavy populations and damage coincide with previous spray areas.

Damage appears as discolored foliage throughout the branches giving entire stands a dirty yellowish-brown appearance. Branch samples appear very dry and twigs in many cases are brittle.

The severity or permanence of this damage is as yet undetermined. The few forest insect records we have on mites occurred prior to the use of DDT in spraying and apparently resulted in little permanent damage. Attempts are still being made to assess the damage and arrangements have been made for cooperation with Canadian personnel who have had wide experience with mites. They will visit areas in Montana to give our personnel the benefit of their experience.

It is believed that spraying in 1956 coincided with a natural upsurge in mite populations resulting in greater damage in sprayed areas. Millions of acres have been sprayed since 1948 without mite troubles. The life of a normal upsurge in mite populations in forests is not known.

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If a return to normal level is reached in a short time spraying probably would produce no excessive damage. On the other hand if populations are still abnormally high we might expect continued damage with spraying. Efforts are being continued to get additional data which would aid in interpreting this mite situation.

INSECT CONDITIONS IN R-4

Spruce Budworm /Choristoneura fumiferana (Clem.)/

The spruce budworm infestations in southern Idaho became quite noticeable and severe during 1952. Since that time their extent and severity have increased. Starting in 1955 spray programs were organized and carried on as listed below.

1955	-	893,214 acres
1956	-	475,901 "
1957	-	660,632 "
Total		2,029,747

The spray program has thus treated all of the older infestations in southern Idaho with one exception. On the Sawtooth an area of 77,300 acres has been infested for about 5 years. This year about 22,000 acres of new infestation have been added. This particular infestation has fluctuated in intensity during the period around a point of severity that is generally lower than in other infestations. Considerable parasitism has been noted and the decision reached to forego spraying unless damage becomes significantly greater.

The remaining infestations in southern Idaho might be termed 1- and 2-year-old outbreaks, that is at noticeable damage levels.

Aerial surveys during 1957 supplemented by ground examinations revealed approximately 512,300 acres of infestation on the Boise, Challis, Payette, Sawtooth, and Salmon National Forests. Part of this acreage on the Sawtooth has been mentioned above. A few areas of reinfestation or buildup in previously sprayed areas were noted: 17,600 acres on the Boise, and 34,100 acres on the Salmon. The latter is a bit puzzling. The area was sprayed in 1955 and control, measured in the usual manner, was excellent. In spite of this the population now present in the areas is significant. In other areas of reinfestation the buildup is less surprising because of recognized misses and poorer control.

Acreage of budworm on the Salmon Forest totals 284,400. In spite of the fact that the majority of the infestation is mostly 1 to 2 years of age, the rate of increase is the important feature of the area. The infestation rates medium to heavy with 134,000 acres rated as heavy. The areas on other forests are smaller and scattered. More detail is presented in a report on the budworm situation in southern Idaho.

Damage by spider mites was found this season primarily in areas sprayed for control of budworm in 1956 and in one case an area treated in 1955. In southern Idaho some 22,300 acres of fir have been heavily damaged. Some light infestations have appeared outside sprayed areas but the severe damage appears to be related to project areas. Our impression is that damage by spider mite in one season is much worse than several years of defoliation by budworm.

Tussock Moth (Hemerocampa pseudotsugata McD.)

During 1951 the Douglas-fir tussock moth reached outbreak proportions in Owyhee County in Idaho. At that time about 10,000 acres of second-growth Douglas-fir were heavily infested. The following year the outbreak subsided with limited tree mortality and some top killing. The fir is growing on an excellent site and the prospects are good for future timber production.

In 1956 it was reported that the insect was again active in the same area. Surveys revealed considerable defoliation in parts of the infestation. There was evidence of considerable parasitism. During the present season defoliation again occurred ranging from light to heavy. In areas classified as heavy the greatest defoliation took place in the upper crowns and top-killing could result where tops were denuded. A gross acreage of 26,000 acres was mapped from the air. Unless control is attempted or biological factors operate at higher level this infestation could produce considerable damage to the stand next year.

Within the Owyhee area a confounding situation on alpine fir was encountered. Heavy defoliation was noted but the insect has not been identified. The type of present damage on the alpine fir with the absence of pupal cases has some characteristics of sawfly damage. (See alpine fir defoliator).

Pine Butterfly (Neophasia menapia F&F)

Following the control work on the Boise Forest a few years ago special attention has been given to detection of any pine butterfly infestations. This year several localized infestations were discovered none of which are of any size or consequence. It does indicate continued vigilance. These spot infestations were found on the Payette, Boise, and Salmon Forests.

Alpine Fir Defoliator

For the second year heavy defoliation of alpine fir has occurred in areas sprayed for budworm control the previous year. This year it was found outside sprayed areas. Approximately 153,000 acres are affected, 103,700 of which are on the Boise Forest. Since the survey was based on damage the insect was not available for collection and identification at

the time survey crews were in the area. However, a few collections of insects made during research studies may include the defoliator but contents of the samples have not yet been identified.

Fir Needle Miner (Epinotia meritana Hein.)

The outbreak of fir needle miner in the Bryce Canyon National Park area is now reduced to an endemic level. Partially responsible for the decrease was the aerial test spraying of about 4,000 acres with an oil solution of malathion. Parasites also contributed to the over-all reduction of the needle miner population. Infestations on adjoining Dixie National Forest land also show a downward trend.

Approximately 10,000 acres of white fir were heavily defoliated during the course of this epidemic in the Park and on the Forest. Some tree killing occurred, principally understory trees. The stand is now in a weakened condition and therefore more susceptible to fir engraver beetles, primarily Scolytus ventralis.

Douglas-fir Sawfly (Neodiprion abietis complex)

Surveys show that sawflies are still active in the Craters of the Moon National Monument. The infestation is not particularly serious but the limited fir in the area is considered of aesthetic value. Sawflies in Douglas-fir have been observed at endemic levels rather generally throughout southern Idaho.

Douglas-fir Beetle (Dendroctonus pseudotsugae Hopk.)

The Douglas-fir beetle has caused tremendous losses in the past in southern Idaho. Our aerial surveys being based on faders reveals loss of the previous year. Ground surveys are required to determine current loss. The aerial surveys of the last two years indicated a downward trend. This has been confirmed during research studies in the area.

There are a few areas that indicate that the species is still active. These were noted on the Boise Forest and a few new spots were noted on the Sawtooth Forest.

In the other portions of Region 4--western Wyoming, eastern Idaho, and Utah--the Douglas-fir beetle has continued to show a downward trend with one exception. On the Dixie National Forest and adjoining land the species continues to cause heavy damage. The fir type occurs in patches with practically all stands heavily infested. There are many pockets 300 acres or larger where almost total kill has occurred. Some salvage is under way.

Alpine Fir Engravers (Scolytus and/or Dryocetes)

Losses from these beetles in southern Idaho are scattered throughout the fir areas generally at endemic levels. The only heavy concentration of damage is within the Roaring River drainage on the Boise Forest.

General throughout the rest of Region 4 the damage caused by the fir engraver beetle (Scolytus ventralis Lec.) seems to be decreasing. Nevertheless considerable tree killing is taking place in widely scattered areas throughout the region.

In southern Utah on and near Bryce Canyon National Park there has been a sharp increase of fir engraver beetle activity in the white fir stands weakened by the fir needle miner (Epinotia meritana Hein.). The Park suggests a pilot test of control along the scenic highway. While there are recognized difficulties in picking out infested trees that are only attacked in patches, the Park is confronted with numerous trees wholly infested and easily recognizable. Admitting that control cannot be as effective as in the case of other bark beetles it might be worth testing the method in this limited area, especially since the contributing factor of needle miner is reduced this year.

Mountain Pine Beetle (Dendroctonus monticolae Hopk.)

Mountain pine beetle activity in the lodgepole forests of Region 4 is on the increase. On the Sawtooth National Forest in Idaho small maintenance control jobs have been carried on in campground areas and along roads against mountain pine beetle for the past several years. This year additional grouping of trees has been noted in other areas. The survey is still in progress but present estimates total about 2,000 infested trees. Surveys also show infestation centers on Grand Teton National Park, Teton, Wasatch, and Ashley National Forests, and on private land near the upper end of the Targhee National Forest. The size of the infested centers vary from 50 trees in smaller infestations to over 120,000 infested trees on the Wasatch.

On Grand Teton National Park five centers of mountain pine beetle were found. Two of these epidemic areas (Signal Mountain and Pacific Creek) were treated in 1957. The treatment produced a satisfactory reduction in the number of infested trees but some infestation is still present. The other infested centers are located near Two Ocean Lake, east of Signal Mountain, and along the Snake River and contain from 50 to 300 infested trees.

The adjoining Teton National Forest has four centers of mountain pine beetle activity. Three of these, Dell Creek, West Shoal, and Ditch Creek were treated last year. The fourth area, Antelope Mountain contains about 550 infested trees on roughly 800 acres.

The extensive infestation on the Wasatch National Forest is still extremely active. Observations show that this infestation has started to extend beyond the boundaries that have remained nearly the same for the last three years. A systematic ground survey of the area shows an estimated 123,000 infested trees on less than 100,000 acres of lodgepole pine type. Three smaller infestations of mountain pine beetle were found on the Wasatch National Forest, two on Bear River and one on Provo River.

The aerial survey located eight centers of mountain pine beetle activity on the Ashley National Forest. Only one, Pole Creek, had shown epidemic tendencies last year. The seven new areas are located in the Lake Fork, Rock Creek, Hell Canyon, Yellowstone, and Dry Gulch drainages. Ground surveys of these areas are in progress but have not been completed. Indications are that the size of these spots of infestation will run between 50 and 7,000 infested trees.

There are two centers of infestation on private land near the north end of the Targhee National Forest. One contains about 60 and the other about 500 infested trees.

The potential that exists in these "hot spots" is disturbing. If left unchecked they might develop into larger outbreaks if the tendency noted last year and this season continues.

The mountain pine beetle is also active in a second-growth stand of ponderosa pine in the Crystal Bay area of Lake Tahoe, Nevada. This serious outbreak covering about 4,000 acres of private land represents a threat to the adjoining high value recreational and summer home areas around the north end of the lake. State authorities were advised of services available if it is decided to control the epidemic. A survey is planned for early November since the latest survey was made last April.

Engelmann Spruce Beetle (Dendroctonus engelmanni Hopk.)

The outbreak of Engelmann spruce beetle on the Bridger National Forest discovered in 1955 is still aggressive. The program of logging and use of trap logs continues as planned.

In order to obtain more detailed information this year in the outbreak area intensified surveys were conducted. Other surveys were carried on in spruce areas outside of the present infestation. The results show that the beetles have not spread to adjacent spruce areas which show no abnormal populations. Within the main area around Gypsum Creek there are approximately 37,000 infested trees and stumps on 24,000 gross acres. As much as 33 percent of the spruce has been killed in some unit areas. It is the only serious Engelmann spruce beetle situation known in Region 4 at this time. A detailed report is now being completed.

Black Hills Beetle (Dendroctonus ponderosae Hopk.)

The present outbreak of Black Hills beetle on the Dixie National Forest and Bryce Canyon National Park is now in its eighth year. By a combination of logging and direct chemical treatment populations of beetles have been reduced in many centers. Unfortunately conditions are such that epidemic centers continue to develop in new areas making it necessary to continue control.

The fall survey is under way and final figures are not available. While results of control over the past several years have been highly encouraging there are areas that should receive attention again next season. This year for the first time a large stand of virgin ponderosa pine on the Escalante side of the forest shows "red tops" indicating that epidemic conditions may be encountered. Estimates will be made for control based on the latest available information for submission by November 1 to be followed by details in the appraisal report.

The ponderosa forests in the area have suffered from deficient rainfall for the past seven years. This year rainfall has been well distributed throughout the season and in amounts that should break the drought condition. We have assumed that deficient rainfall has contributed to stand susceptibility. It would seem that efforts should continue to control the beetle as centers develop in hopes that better moisture conditions will assist by increasing the stand vigor.

Western Pine Beetle (Dendroctonus brevicomis Lec.)

Western pine beetle is at endemic level in Region 4 this year.

Spruce Mealybug (Puto sp.)

About 60,000 acres of Engelmann spruce in southern Utah in two centers on the Dixie and Fishlake National Forests are heavily infested with a mealybug. From present knowledge it occurs only in this spruce area. The mealybug infests all ages from reproduction to mature trees. Limited studies of the life history and habits are being conducted to develop basic information needed to assess its importance. Considerable damage, in the form of tree deformity and reduced vigor is present in areas where the pest has been active for several years. The extent of tree killing has not been determined but probably occurs only after continued feeding and gradual decline in vigor. No control methods are known.

Southwestern Pine Beetle (Dendroctonus barberi Hopk.)

The southwestern pine beetle continues to kill ponderosa pine on the highly used recreational areas of Charleston Mountain near Las Vegas, Nevada. This area was recently transferred from the Nevada National Forest to the Toiyabe National Forest. Constant maintenance type control throughout the active season has been in progress for several years.

These efforts have reduced the rate of loss considerably. Continued use of maintenance control is indicated. Actual survey is scheduled early in November.

Ips species

Increased activity by Ips sp. in areas in southern Utah and western Nevada have been noted on pinyon pine. In centers of infestation groups as large as 3,000 trees have been killed.

REGION 1

Defoliators

Spruce Budworm /Choristoneura fumiferana (Clem)/

The budworm has been a serious problem in Region 1 for nearly 10 years. Spray projects since 1953 have treated more than 2 million acres.

The 1957 aerial and ground surveys show approximately 2,846,000 acres of Douglas-fir still infested, 90 percent of which is in Montana with the remainder in the Craig mountain area in northern Idaho. This total of uncontrolled infested acreage represents an increase of about 100,000 acres. In general terms it can be said that all situations were encountered. Infestations in some areas were less intense, others at the same level, and of course some showed increases compared to conditions in 1956.

Infestations that have been severe for the past few years are causing considerable damage. Often this damage appears as "hot spots" within extensive acreages of fir type. In many areas the younger understory trees have been killed. This occurs quite generally over large areas.

A review of all reported infestations was made at the end of the survey season. Spraying over the past few years has been planned to include units that would clean up the over-all infestation as performed from south to north. The remaining infestations include considerable private land which emphasizes the need for cooperation in order to successfully carry on a long range program such as this. Details of the over-all budworm outbreak will be included in a special budworm report.

The mite problem in Region 1 is much more severe than in southern Idaho. In 1956 a total of 885,000 acres was sprayed. This year, late in the summer, extensive browning of foliage was observed. Immediate surveys revealed that mite populations had caused such damage that the stands presented a dirty yellowish-brown appearance even at some distance. It now appears that approximately 750,000 of the 885,000 acres has suffered this damage. Only limited acreage of mite damage outside

sprayed areas has been found--this within 3 miles or so of spray areas. It could well have received spray from drift or poor swathing by spray pilots.

From the observations in Montana and southern Idaho it appears certain that the spray operations have a direct bearing on the buildup of mites.

Black-headed Budworm /Acleris variana (Fern.)/

High endemic populations of the black-headed budworm are reported throughout many Douglas-fir stands in Montana in conjunction with spruce budworm populations. This is particularly noticeable east of the Continental Divide. Epidemic populations of black-headed budworm caused heavy defoliation in western hemlock stands in scattered locations in the Kootenai National Forest and in Glacier National Park in Montana and in the Kaniksu in Idaho. Aerial surveys showed that these scattered infestations total approximately 32,000 acres on which hemlock damage is highly visible. Ground surveys have also recorded active infestations in grand fir stands in the Pend Oreille River drainages in Newport, Washington. Damage, however, is hardly visible. Additional ground surveys in hemlock stands indicate that although damage was heavy in 1957, budworm populations going into winter are light. In some cases there was a drastic reduction in larval population prior to pupation. Additional surveys of this nature are being made. It is believed that the trend of this infestation is toward endemic conditions.

Larch Insects

In 1955 and 1956 considerable defoliation of western larch in Montana and northern Idaho was reported. There was some confusion because of the presence of several species in the infestations. This season observations have clarified the situation.

The larch budmoth, Zeiraphera griseana (Hubner) was first observed in 1955. During the next years the aggregate acreage of visible defoliation increased from 33,000 to an estimated 250,000 acres in scattered centers. Ground examinations of foliage damage has been difficult because of the large size of the trees which had to be felled for close observation. The examinations have revealed that the budmoth has caused a reduction in leaf surface of at least 50 percent in 1957. Budmoth damage of this magnitude has not previously occurred in the region. It appears that the budmoth occurs at the higher elevations. Attempts to accumulate more information on this species continue.

A larch looper, Semiothisa sexmaculata (Pack.) developed from 1955 to 1957 into the most widespread defoliator of larch in the northern Rockies although there are no records of its presence prior to 1955. It was found in every larch stand in Montana and Idaho where examinations were made but always at lower elevations than the stands infested by

budmoth. With few exceptions, looper populations were relatively light and the injury was negligible. Feeding damage became visible in September.

Larch Sawflies

During the past two years populations of the two-lined larch sawfly (Anoplonyx occidens Ross) and occasionally the western Larch sawfly (A. laricivorus Roh.and Midd.) were observed in association with populations of the above looper throughout the range of western larch in Montana and northern Idaho. The visible damage to the foliage as a result of their feeding appeared slight.

Larch Casebearer /Coleophora laricella (Hbn)/

The larch casebearer, a European insect widely distributed in the eastern United States, made its appearance in northern Idaho for the first time in 1957. No doubt it had been present for some time before being noted. An infestation of approximately 5,000 acres near St. Maries, Idaho, was reported during the year in young larch stands. The feeding produced severe defoliation on the infested trees and a heavy population is present going into hibernation on twigs.

When an introduced insect appears in a new area there is always concern over its behavior and damage under new environmental conditions. Immediate steps have been taken to investigate its epidemiology under western forest conditions. Because of reported heavy parasitization of larch casebearer in the East by P. B. Dowden in his recent article in the Journal of Forestry on biological control an inventory of parasites within the population in Idaho is in order. If it is found that parasitism is low or lacking in Idaho, transfer of parasites from the eastern United States is indicated. Additional surveys of larch will be made to determine if the species is present in other areas.

Douglas-fir Tussock Moth (Hemerocampa pseudotsugata McD.)

No active infestations of the Douglas-fir tussock moth were reported in the region in 1957.

Cooley Gall Louse (Chermes cooleyi Gill)

High endemic infestations of the Cooley gall louse were reported in Douglas-fir Christmas tree stands in the upper Kootenai River and Tobacco River valleys in northwestern Montana. The infestations are associated with severe infections of the Douglas-fir needle blight, Rhabdocline pseudotsugae Syd. Dr. Waters of Montana State University visited the stands with entomologists and confirmed the presence and severity of the needle blight.

Scale Insects

Small localized infestations of the black pine leaf scale, Nuculaspis californica (Coleman) and the pine leaf scale, Phenocaspis pinifoliae (Fitch), were reported on ponderosa pine trees near Spokane, Washington. These infestations are remnants of epidemic populations that were reduced in 1951 and 1955 by extremely low temperatures. Current damage is insignificant except on a few trees.

Bark Beetles

In a region which for some years has been noted for bark beetle troubles the prevailing pests commanding attention are the defoliators. In general, the bark beetles in 1957 have not been too destructive.

Western Pine Beetle (Dendroctonus brevicomis Lec.)

Mortality of ponderosa pine caused by the western pine beetle remains at a low endemic level throughout the region. Infested trees occur throughout the pine stands but are widely scattered.

Mountain Pine Beetle (Dendroctonus monticolae Hopk.)

Mountain pine beetle infestations in lodgepole pine timber appears to be at a low level throughout Region 1. Two infestations are reported active at this time. On privately owned land near Soldiers Reservoir south of Lewiston, Idaho, an infestation which is believed to have developed in water-killed lodgepole pine several years ago is still highly epidemic. The infestation is confined to pole-type timber in the immediate vicinity of the reservoir but seems to have increased in area each year.

In Glacier National Park an infestation of epidemic proportions continues in a small area of mature lodgepole pine immediately north of Kintla Lake. This infestation has been under observation for several years by both aerial and ground surveys. At the present there are approximately 1,600 infested trees on 300 acres. The Park authorities do not contemplate control attempts.

The mountain pine beetle is active to a limited extent in white pine stands on the Clearwater National Forest in Idaho. Aside from increases in activity in three areas in the forest, the situation has not changed materially for several years. Infestation was found to be killing 0.47 percent of the pine stems in 1957 compared to 0.18 percent in 1956. Surveys in 1951 showed that beetle kill was from 0.7 to 1.3 percent of the stems in that year. The heaviest damage this year was found along the Clearwater River Canyon north of Sheep Mountain where 1.03 percent of stems was killed. The losses in this stand, the largest remaining block of western white pine in Idaho, can be considered normal.

The mountain pine beetle in ponderosa pine in Region 1 has killed only scattered single mature trees.

Douglas-fir Beetle /Dendroctonus pseudotsugae (Hopk.)/

Only one infestation of Douglas-fir beetle of consequence was reported during 1957. Approximately 25 percent of the mature overstory trees on 1,000 acres in the Yellowstone River Canyon in Yellowstone National Park has been killed by the beetle during the past three years. These trees were previously heavily defoliated by the spruce budworm in 1953-1955.

Engelmann spruce beetle (Dendroctonus engelmanni Hopk.)

Remnants of the 1952-1956 epidemic of the Engelmann spruce beetle remain alive in some stands of pure spruce where logging is being conducted for control purposes. However, in most instances where stands are composed of pure mature spruce and where they have been logged for beetle control the infestation has died out. Continued logging reduces the severity of the outbreaks to a certain level but "hot spot" centers have been noted apparently maintained by chunks, cull logs, and tops shaded by residual trees. Also blowdown trees adjoining cutting areas contribute to the situation. Continued effort will be required in "hot spot" areas to prevent increased damage. It is believed that block cutting which would leave little to shade material now serving as breeding material would be helpful. Perhaps cleaning up of breeding material following cutting with attention to expected blowdown on edges of cutting areas is in order.

Ips Engraver Beetles

Losses in ponderosa and western white pine stands from engraver beetles were insignificant in 1957.